

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims

1. (Currently Amended) A reproducing apparatus, comprising:

reproducing means for reproducing an information signal;

equalizing means for controlling a group delay of the information signal reproduced by said reproducing means;

converting means for sampling the information signal output from said equalizing means and for converting the information signal into a digital signal composed of a plurality of bits per sample;

detecting means for detecting a converting the digital signal from the information signal reproduced by said reproducing means output from said converting means into a n-values signal per sample; and

control means for controlling a group delay characteristic of said equalizing means by using the reproduced information digital signal to be inputted to said detecting means and a detection result of the n-values signal output from said detecting means.

2. (Original) A reproducing apparatus according to claim 1, wherein said equalizing means further controls an amplitude of the information signal reproduced by said reproducing means, and said control means further controls an amplitude characteristic of said equalizing means by using the reproduced information signal to be inputted to said detecting means and the detection result of said detecting means.

3. (Currently Amended) A reproducing apparatus according to claim 1, wherein said

control means includes multiplying means for multiplying the reproduced information digital signal to be inputted input to said detecting means by the detection result of to be input to said detecting means by the n-values signal output from said detecting means, and an integrating means for integrating a result of multiplication of said multiplying means, and controls the group delay characteristic of said equalizing means according to an output of said integrating means.

4. (Currently Amended) A reproducing apparatus according to claim 3, wherein said multiplying means includes $2n+1$ multipliers (n being an integer not less than "2") for respectively multiplying a detection result the n-values signal of a predetermined sample and the n-values signal detection results of n samples obtained both before and after the predetermined sample samples by the digital signal corresponding to the n-values signal included in the detection result of said detecting means, by the reproduced information signal corresponding to the detection result of the predetermined sample, and said integrating means includes $2n+1$ integrators for respectively integrating outputs of said $2n+1$ multipliers.

5. (Original) A reproducing apparatus according to claim 4, wherein said equalizing means includes a first group delay control circuit for controlling a group delay of a first predetermined frequency band, and a second group delay control circuit for controlling a group delay of a second predetermined frequency band which is lower than the first predetermined frequency band, and said control means controls a group delay characteristic of said first group delay control circuit according to results of integration of said integrating means of samples obtained $n/2$ samples before and after the predetermined sample, and controls a group delay characteristic of said second group delay control circuit according to results of integration of said integrating means of samples obtained n samples before and after

the predetermined sample.

6. (Original) A reproducing apparatus according to claim 5, wherein said control means makes a comparison between results of integration of said integrating means of samples obtained $n/2$ samples before and after the predetermined sample, and controls the group delay characteristic of said first group delay control circuit according to a result of the comparison.

7. (Original) A reproducing apparatus according to claim 5, wherein said control means makes a comparison between results of integration of said integrating means of samples obtained n samples before and after the predetermined sample, and controls the group delay characteristic of said second group delay control circuit according to a result of the comparison.

8. (Original) A reproducing apparatus according to claim 1, wherein said equalizing means includes a first group delay equalizing circuit for controlling a group delay of a first predetermined frequency band, and a second group delay equalizing circuit for controlling a group delay of a second predetermined frequency band which is lower than the first predetermined frequency band, and said control means controls a group delay characteristic of said first group delay equalizing circuit and a group delay characteristic of said second group delay equalizing circuit independently of each other.

9. (Original) A reproducing apparatus according to claim 8, wherein each of said first group delay equalizing circuit and said second group delay equalizing circuit includes an all-pass filter.

10. (Canceled)

11. (Original) A reproducing apparatus according to claim 1, further comprising:
an FIR (finite impulse response) filter for filtering an output of said equalizing means,
wherein said control means further controls tap coefficients of said FIR filter.

12. (Original) A reproducing apparatus according to claim 1, further comprising:
data detecting means for detecting a digital signal composed of one bit per sample
from the reproduced information signal equalized by said equalizing means; and
signal processing means for subjecting a predetermined process to an output of said
data detecting means.

13. (Original) A reproducing apparatus according to claim 12, wherein the information
signal includes an image signal as coded, and said signal processing means includes decoding
means for decoding the image signal.

14. (Original) A reproducing apparatus according to claim 12, wherein said data
detecting means detects the digital signal composed of one bit per sample by using a Viterbi
algorithm.

15. (Currently Amended) A reproducing apparatus according to claim 1, wherein the
information signal is a PR4-precoded signal, and said detecting means includes a decoder for
PR4-decoding the information signal equalized by said equalizing means digital signal output
from said converting means, and detects a digital signal from the information signal outputted
converts the digital signal output from said decoder into the n-values signal.

16. (Currently Amended) A reproducing apparatus, comprising:
reproducing means for reproducing an information signal;
equalizing means for equalizing controlling a group delay of the information signal
reproduced by said reproducing means; and

control means for controlling an equalizing characteristic of said equalizing means, said control means having a first mode of controlling the equalizing characteristic by using a first control method, and a second mode of controlling the equalizing characteristic by using a second control method

converting means for sampling the information signal output from said equalizing means and for converting the information signal into a digital signal composed of a plurality of bits per sample;

detecting means for converting the digital signal output from said converting means into a n-values signal per sample;

error correcting means for correcting errors in the digital signal output from said converting means and for detecting uncorrectable errors in the digital signal; and

control means for controlling an equalizing characteristic of said equalizing means, said control means having a first mode of controlling the equalizing characteristic by using the digital signal to be input to said detecting means and the n-values signal output from said detecting means and a second mode of controlling the equalizing characteristic by using a detection result of the uncorrectable errors by said error correcting means.

17. (Original) A reproducing apparatus according to claim 16, wherein said control means changes over the first mode and the second mode according to elapsed time.

18. (Original) A reproducing apparatus according to claim 16, wherein said reproducing means reproduces the information signal from a recording medium having a number of helical tracks formed thereon, and said control means changes over the first mode and the second mode according to the number of reproduced tracks of the recording medium.

19-21. (Canceled)

22. (Original) A reproducing apparatus according to claim 16, further comprising:

instruction means for giving an instruction for starting a reproducing operation, wherein said control means controls the equalizing characteristic in the second mode during a predetermined period of time from the instruction for starting the reproducing operation, and controls the equalizing characteristic in the first mode after a lapse of the predetermined period of time.

23-24. (Canceled)